This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A catheter for use in conveyance of a formulation, the catheter comprising:

first and second materials configured to define a tubular structure, the tubular structure having a proximal and a distal end;

wherein the second material has a permeability lower than polyethylene for ~~at least one substance that could cause detrimental change in the properties or composition of~~CO_2 to prevent obstructions from forming in the formulation.

2. (Original) The catheter as recited in claim 1, wherein the first material is disposed outside the second material.

3. (Original) The catheter as recited in claim 1, wherein the first material is disposed inside the second material.

4. (Currently Amended) The catheter as recited in claim 1, wherein the second material comprises a material that has a permeability index for CO_2 that is lower than the permeability index of the outer material for CO_2.

5. (Currently Amended) The catheter as recited in claim 4, wherein the ~~at least one substance comprises CO_2 and wherein the detrimental change occurs~~obstructions form as a result of diffusion of the CO_2 into the catheter.

6. Cancelled.

7. Cancelled.

8. (Original) The catheter as recited in claim 1, wherein the second material comprises a material selected from the group consisting of halogenated polymers.

9. (Original) The catheter as recited in claim 8, wherein the halogenated polymer is selected from the group essentially consisting of polytetrafluorethylene, polyvinylidene chloride and polyvinylidene fluoride.

10. (Original) The catheter as recited in claim 1, wherein the second material comprises a material selected from the group consisting essentially of polyamides, ethylene-vinyl alcohol, polyetheretherketone, nylon and polyester.

11. (Original) The catheter as recited in claim 1, wherein the second material is capillary glass.

12. (Original) The catheter as recited in claim 1, wherein the second material is diamond coated.

13. (Original) The catheter as recited in claim 1, wherein the first material comprises a material that is bio-compatible.

14. (Original) The catheter as recited in claim 2, wherein an inner surface of the first material substantially covers an outer surface of the second material.

15. (Original) The catheter as recited in claim 2, wherein an inner surface of the first material covers only a portion of an outer surface of the second material.

16. (Original) The catheter as recited in claim 15, wherein the portion of the outer surface of the second material covered by the inner surface of the first material is located at the distal end.

17. (Original) The catheter as recited in claim 1, further comprising an interior layer contacting an inner surface of the second material, the interior layer comprising a substance that regulates an interaction of substances with the interior layer.

18. (Original) The catheter as recited in claim 17, wherein the substance is a hydrophilic substance.

19. (Original) The catheter as recited in claim 17, wherein the substance is a hydrophobic substance.

20. (Withdrawn) The catheter as recited in claim 1, wherein an inner diameter of the distal end has a flared shape.

21. (Withdrawn) The catheter as recited in claim 20, wherein an outer diameter of the distal end is substantially constant across the flared shape.

22. (Original) The catheter as recited in claim 1, wherein the proximal end is connected to an implantable infusion pump.

23. (Original) The catheter as recited in claim 1, wherein the first material is more flexible than the second material.

24. (Original) The catheter as recited in claim 1, wherein the first material has a lower flexural modulus than the second material.

25. (Withdrawn) A catheter for use in delivery of a formulation, the catheter comprising:

an outer layer comprising an outer surface and an inner surface;

a barrier layer comprising an outer surface and an inner surface;

a proximal end; and

a distal end having a surface on which an obstruction may form;

wherein the barrier layer further comprises flowholes formed therein at a sufficient upstream distance from any obstruction formed at the distal end, the flowholes providing entry into an annular channel located on the downstream side of the flowholes, the annular channel being bounded by a portion of the inner surface of the outer layer and a portion of the outer surface of the barrier layer, the annular channel providing a passageway out of the catheter for the formulation in the event of an obstruction, the portion of the inner surface of the outer layer, under sufficient pressure, elastically separating from the portion of the outer surface of the barrier layer to complete the passageway.

26. (Withdrawn) The catheter as recited in claim 25, wherein the inner surface of the outer layer substantially covers the outer surface of the barrier layer.

27. (Withdrawn) The catheter as recited in claim 25, wherein the inner surface of the outer layer covers only a portion of the outer surface of the barrier layer.

28. (Withdrawn) The catheter as recited in claim 27, wherein the portion of the outer surface of the barrier layer covered by the inner surface of the outer layer is located at the distal end.

29. (Withdrawn) The catheter as recited in claim 25, wherein an inner diameter of the distal end has a flared shape.

30. (Withdrawn) The catheter as recited in claim 29, wherein an outer diameter of the distal end is substantially constant across the flared shape.

31. (Withdrawn) A catheter for use in delivery of a formulation, the catheter comprising:

an outer layer comprising an outer surface and an inner surface, a portion of the outer surface further comprising an annular plug having an outer surface and an inner surface;

a barrier layer comprising an outer surface and an inner surface;

a proximal end; and

a distal end having a surface on which an obstruction may form;

wherein the barrier layer and the outer layer further comprise flowholes formed jointly therein at a sufficient upstream distance from any obstruction formed at the distal end, the flowholes providing entry into an annular channel located on the downstream side of the flowholes, the annular channel being bounded by a portion of the inner surface of the annular plug and a portion of the outer surface of the outer layer, the annular channel providing a passageway out of the catheter for the formulation in the event of an obstruction, the portion of the inner surface of the annular plug, under sufficient pressure, elastically separating from the portion of the outer surface of the outer layer to complete the passageway.

32. (Withdrawn) The catheter as recited in claim 31, wherein the annular plug comprises a material that is bio-compatible.

33. (Withdrawn) The catheter as recited in claim 31, wherein the inner surface of the outer layer substantially covers the outer surface of the barrier layer.

34. (Withdrawn) The catheter as recited in claim 31, wherein the inner surface of the outer layer covers only a portion of the outer surface of the barrier layer.

35. (Withdrawn) The catheter as recited in claim 31, wherein the portion of the outer surface of the barrier layer covered by the inner surface of the outer layer is located at the distal end.

36. (Withdrawn) The catheter as recited in claim 31, wherein an inner diameter of the distal end has a flared shape.

37. (Withdrawn) The catheter as recited in claim 36, wherein an outer diameter of the distal end is substantially constant across the flared shape.

38. (Withdrawn) A catheter for use in conveyance of a formulation, the catheter comprising:

an outer material;

an inner barrier material;

a proximal end; and

a distal end;

wherein the outer material protrudes a distance beyond the inner barrier material at the distal end and forms a generally semi spherical segment spaced from and enclosing the distal end, the semi spherical segment comprising at least one slit formed thereon, the at least one slit expanding upon a pump stroke of an infusion pump to release the formulation and closing at an interval between pump strokes to hinder inflow of substances into the distal end of the catheter.

39. (Withdrawn) The catheter as recited in claim 38, wherein the inner surface of the outer material substantially covers the outer surface of the inner barrier material.

40. (Withdrawn) The catheter as recited in claim 38, wherein the inner surface of the outer material covers only a portion of the outer surface of the inner barrier material.

41. (Withdrawn) The catheter as recited in claim 40, wherein the portion of the outer surface of the inner barrier material covered by the inner surface of the outer material is located at the distal end.

42. (Withdrawn) The catheter as recited in claim 38, wherein an inner diameter of the distal end has a flared shape.

43. (Withdrawn) The catheter as recited in claim 42, wherein an outer diameter of the distal end is substantially constant across the flared shape.

44. (Currently Amended) An implantable infusion pump system for use in delivery of a formulation, the system comprising:

a pump for delivering measured doses of a formulation;

a sensing device for regulating the delivery of the formulation; and

a catheter for conveying the formulation from the pump to an infusion site, the catheter comprising:

an outer material;

an inner barrier material;

a proximal end attached to the pump; and

a distal end located at the infusion site;

wherein the barrier material has a permeability lower than polyethylene for CO_2 to prevent obstructions from forming in~~at least one substance that could cause detrimental change in the properties or composition of~~ the formulation.

45. (Withdrawn) An implantable infusion pump system for use in delivery of a formulation, the system comprising:

a pump for delivering measured doses of a formulation;

a sensing device for regulating the delivery of the formulation; and

a catheter for conveying the formulation from the pump to an infusion site, the catheter comprising:

an outer layer comprising an outer surface and an inner surface;

a barrier layer comprising an outer surface and an inner surface;

a proximal end attached to the pump; and

a distal end located at the infusion site, the distal end having a surface on which an obstruction may form;

wherein the barrier layer further comprises flowholes formed therein at a sufficient upstream distance from any obstruction formed at the distal end, the flowholes providing entry into an annular channel located on the downstream side of the flowholes, the annular channel being bounded by a portion of the inner surface of the outer layer and a portion of the outer surface of the barrier layer, the annular channel providing a passageway out of the catheter for the formulation in the event of an obstruction, the portion of the inner surface of the outer layer, under sufficient pressure, elastically separating from the portion of the outer surface of the barrier layer to complete the passageway.

46. (Withdrawn) An implantable infusion pump system for use in delivery of a formulation, the system comprising:

a pump for delivering measured doses of a formulation;

a sensing device for regulating the delivery of the formulation; and

a catheter for conveying the formulation from the pump to an infusion site, the catheter comprising:

an outer layer comprising an outer surface and an inner surface, a portion of the outer surface further comprising an annular plug having an outer surface and an inner surface;

a barrier layer comprising an outer surface and an inner surface;

a proximal end; and

a distal end having a surface on which an obstruction may form;

wherein the barrier layer and the outer layer further comprise flowholes formed jointly therein at a sufficient upstream distance from any obstruction formed at the distal end, the flowholes providing entry into an annular channel located on the downstream side of the flowholes, the annular channel being bounded by a portion of the inner surface of the annular plug and a portion of the outer surface of the outer layer, the annular channel providing a passageway out of the catheter for the formulation in the event of an obstruction, the portion of the inner surface of the annular plug, under sufficient pressure, elastically separating from the portion of the outer surface of the outer layer to complete the passageway.

47. (Currently Amended) An implantable infusion pump system for use in delivery of a formulation, the system comprising:

a pump for delivering measured doses of a formulation;

a sensing device for regulating the delivery of the formulation; and

a catheter for conveying the formulation from the pump to an infusion site, the catheter comprising:

a proximal end attached to the pump; and

a distal end located at the infusion site;

wherein the catheter comprises a material having a permeability lower than polyethylene for CO_2 to prevent obstructions from forming in ~~at least one substance that could cause detrimental change in the properties or composition of~~ the formulation.

48. (Original) The implantable infusion pump system as recited in claim 47, wherein the material comprises a material selected from the group consisting of halogenated polymers.

49. (Original) The implantable infusion pump system as recited in claim 48, wherein the halogenated polymer is selected from the group essentially consisting of polytetrafluorethylene, polyvinylidene chloride and polyvinylidene fluoride.

50. (Original) The implantable infusion pump system as recited in claim 47, wherein the material comprises a material selected from the group consisting essentially of polyamides, ethylene-vinyl alcohol, polyetheretherketone, nylon and polyester.

51. (Original) The implantable infusion pump system as recited in claim 47, wherein the material is capillary glass.

52. (Original) The implantable infusion pump system as recited in claim 47, wherein the material is a diamond coated material.

53. (Currently Amended) A catheter for use in conveyance of a formulation, the catheter comprising:

an outer material;

an inner material;

a proximal end; and

a distal end;

wherein at least one of the outer material and the inner material has a permeability lower than polyethylene for CO_2 to prevent obstructions from forming in ~~at least one substance that could cause detrimental change in the properties or composition of~~ the formulation.

54. (Original) A catheter for use in delivery of a formulation, the catheter comprising:

an outer layer comprising an outer surface and an inner surface;

a barrier layer comprising an outer surface and an inner surface;

a proximal end; and

a distal end;

wherein the inner surface of the outer layer covers the outer surface of the barrier layer only at the distal end of the catheter.

55. (New) A catheter for use in conveyance of a formulation, the catheter comprising:

first and second materials configured to define a tubular structure, the tubular structure having a proximal and a distal end;

wherein the second material has a permeability lower than polyethylene for phenolic compounds to prevent obstructions from forming in the formulation.

56. (New) The catheter as recited in claim 55, wherein the first material is disposed outside the second material.

57. (New) The catheter as recited in claim 55, wherein the first material is disposed inside the second material.

58. (New) The catheter as recited in claim 55, wherein the obstructions occur as a result of diffusion of the phenolic compounds out of the catheter.

59. (New) The catheter as recited in claim 55, wherein the phenolic compounds comprise at least one of phenol and m-cresol.

60. (New) The catheter as recited in claim 55, wherein the second material comprises a material selected from the group consisting of halogenated polymers.

61. (New) The catheter as recited in claim 60, wherein the halogenated polymer is selected from the group essentially consisting of polytetrafluorethylene, polyvinylidene chloride and polyvinylidene fluoride.

62. (New) The catheter as recited in claim 55, wherein the second material comprises a material selected from the group consisting essentially of polyamides, ethylene-vinyl alcohol, polyetheretherketone, nylon and polyester.

63. (New) The catheter as recited in claim 55, wherein the second material is capillary glass.

64. (New) The catheter as recited in claim 55, wherein the second material is diamond coated.

65. (New) The catheter as recited in claim 55, wherein the first material comprises a material that is bio-compatible.

66. (New) The catheter as recited in claim 55, wherein an inner surface of the first material substantially covers an outer surface of the second material.

67. (New) The catheter as recited in claim 55, wherein an inner surface of the first material covers only a portion of an outer surface of the second material.

68. (New) The catheter as recited in claim 67, wherein the portion of the outer surface of the second material covered by the inner surface of the first material is located at the distal end.

69. (New) The catheter as recited in claim 55, further comprising an interior layer contacting an inner surface of the second material, the interior layer comprising a substance that regulates an interaction of substances with the interior layer.

70. (New) The catheter as recited in claim 69, wherein the substance is a hydrophilic substance.

71. (New) The catheter as recited in claim 69, wherein the substance is a hydrophobic substance.

72. (New) The catheter as recited in claim 55, wherein the proximal end is connected to an implantable infusion pump.

73. (New) The catheter as recited in claim 55, wherein the first material is more flexible than the second material.

74. (New) The catheter as recited in claim 55, wherein the first material has a lower flexural modulus than the second material.